Efficient and powerful 3-litre PC

The ultra-compact Shuttle Slim-PC Barebone XH81 is an ideal basis for a small, but powerful Mini PC. Not only is it suitable for a low-noise home-media PC with support of 4K displays, it also meets the requirements towards an office PC and industrial applications. It features two Gigabit-LAN interfacessfor server applications and two serial COM ports which are commonly required for connecting many professional devices. Its two digital video outputs allow for operating two displays at the same time. In a team with 22nm socket LGA1150 Intel "Haswell" processor and a 2.5" SSD drive the XH81 makes for a power-efficient and reliable system for a wide range of applications. The built-in heatpipe cooling ensures the system runs quietly at maximum stability.

Feature Highlights

Slim-Design	• Slim 3.5 litre chassis, black • Dimensions: 23.8 x 20 x 7.2 cm (L/W/H) • Bays: 2x 6.35cm/2.5" for hard disks or SSDs and 1x optical slimline drive • Max. operating temperature: 0~50°C
Processor	• Supports LGA1150 "Haswell" processors: Core i7 / i5 / i3, Pentium, Cel. (max. 65W) • Including heatpipe cooling system
Chipset	• Intel H81 Express Chipset
Memory	• 2x 204 pin SO-DIMM slots • Supports DDR3-1333/1600, max. 2x 8 GB
Graphics	• Integrated Intel HD graphics supports 4K (Depending on processor) • Video outputs: HDMI 1.4 & DisplayPort 1.2
Drive Connectors	• 3x Serial ATA (2x 6 Gbit/s and 1x 3 Gbit/s) • Two pre-installed SATA cables (HDD+ODD)
Other Connectors	• 5.1 HD Audio (digital audio via HDMI/DP) • 2x USB 3.0 front, 6x USB 2.0 (2 front, 4 rear) • Dual Gigabit LAN (RJ45), supports WOL, PXE • 2x COM ports (RS232 + RS232/RS422/RS485)
Optional Accessories	• Vertical stand (PS01) • VESA mount (PV02) • VGA port adapter (PVG01) • WLAN kit (WLN-S)
Power Supply	• External 90W fanless power adapter
Applications	• Home, office, vertical market

Shuttle Slim-PC Barebone

XH81

Images for illustration purposes only.
The vertical stand and the optical drive are not included in the scope of delivery

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UPC bar code: 811686006817

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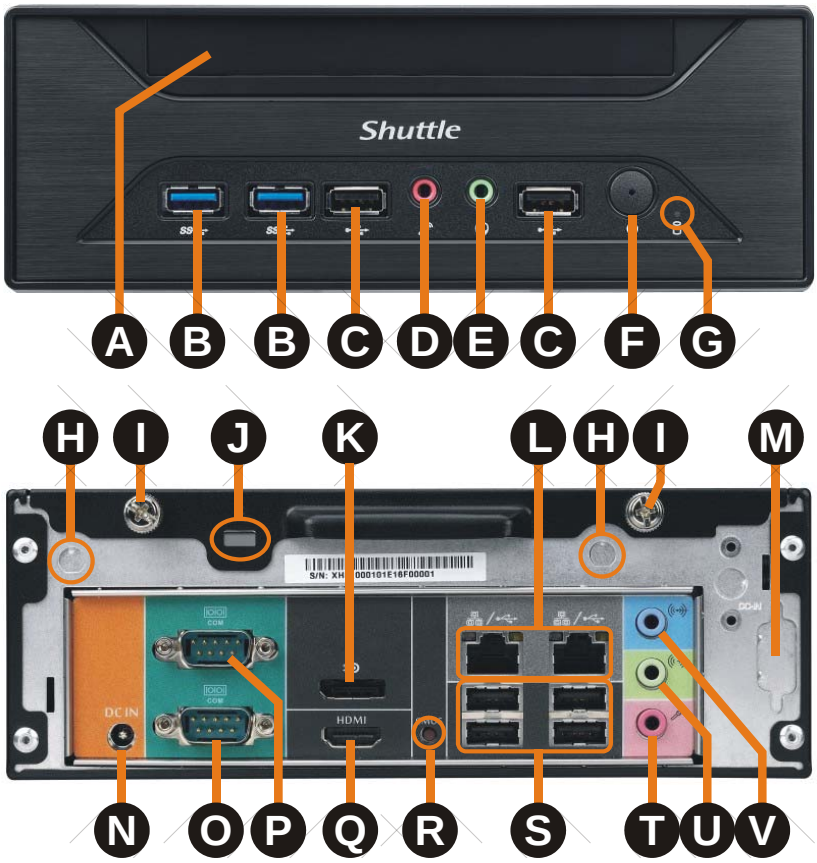
Shuttle Slim-PC Barebone XH81 – Front and Back Panel



Front Panel

- **A** 5.25“ bay for optical slimline drive (DVD or Blu-ray)
- **B** 2x USB 3.0 ports
- **C** 2x USB 2.0 ports
- **D** Microphone input
- **E** Headphone output
- **F** Power on button with LED
- **G** LED indicator for hard disk activity

Back Panel

- **H** 2x perforation for optional WLAN antennas
- **I** 2x thumbscrews
- **J** Hole for Kensington Lock
- **K** DisplayPort Video/Audio output
- **L** Dual Gigabit network (RJ45)
- **M** Perforation for optional VGA-out (PVG01)
- **N** Connector for power adapter
- **O** RS232 / RS422 / RS485 serial interface (COM)
- **P** RS232 serial interface (COM port)
- **Q** HDMI Video/Audio output
- **R** Clear CMOS button
- **S** 4x USB 2.0
- **T** Microphone input
- **U** Headphone / line-out
- **V** Audio line-in

COM port Pin 9 Configuration
Pin 1 is a multi-functional signal. Based on Jumper 3 configuration on the mainboard, it can be configured as Ring Indicator (RI) or external power supply with either 5V or 12V voltage level (each COM port separately).

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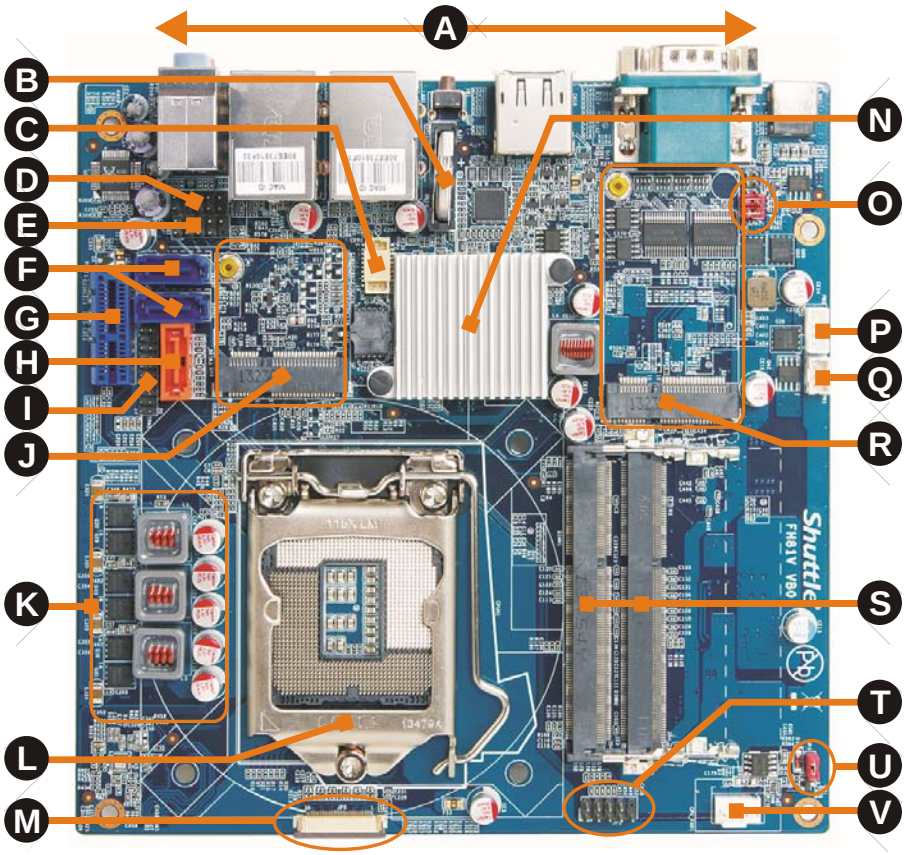
Shuttle Slim-PC Barebone XH81 – Mainboard



- **A** Back panel (rear side)
- **B** CMOS Battery
- **C** VGA Video Output
- **D** Front Audio Header
- **E** USB 2.0 Header
- **F** 2x Serial ATA 6G
- **G** PCI-Express X1 Slot (cannot be used)
- **H** 1x Serial ATA 3G
- **I** LPC-Slot
- **J** Half-Size Mini-PCIe
- **K** CPU Voltage Regulator
- **L** LGA1150 CPU Socket
- **M** Connector for Front USB 3.0 Ports
- **N** Intel H81 Chipset
- **O** COM Port Jumper JP1
- **P** SATA Power 5V
- **Q** SATA Power 12V
- **R** Full-Size Mini-PCIe supports mSATA
- **S** 2x SO-DIMM Slots
- **T** Connector for Front Buttons and LED's
- **U** Always-On-Jumper JP4
- **V** Fan Connector

Supports three drives

The XH81 supports one optical drive in 5.25" slimline format and two 2.5" drives (e.g. hard disk and SSD). The second 2.5" drive requires an additional SATA cable and mounting screws which is not included.

Note: The storage drives (hard disk and optical drive) are not included in the delivery of XH81.

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XH81(V)-Series and Accessory Overview

XH81V Black
XH81V White

With covers
for the optical drive bay and the I/O ports

XH81 Black

Free accessible front (without covers)

Vertical Stand (PS01)

The XH81(V) is to be used in horizontal operation by default. The optional stand PS01 allows to be used in upright position also.

VESA-mount (PV02)

The optional VESA75/100 wallmount allows it to be installed on to walls or affixed to the rear side of a monitor.

VGA-Port Adapter (PVG01)

Optional D-Sub VGA Video Output

WLAN-Kit (WLN-S)

Wireless LAN adapter with two external antennas supports IEEE 802.11b/g/n at max. 300 Mbit/s.

Drive bay cover (for XH81V only)

Cover for the slimline drive bay.
Please contact Shuttle for "Mylar POI-MY01". [7]

Triple COM Ports (for XH81 only)

This accessory provides three additional COM ports to the front panel which means the upper bay can no longer be used for an optical drive.

Please contact Shuttle for availability.

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Connectivity / Applications

The XH81's wealth of ports qualifies it for a wide range of applications and external devices.

The XH81 is your powerful 3.5-litre Slim-PC solution for high performance driven applications, e.g.:

- Digital Signage
- In-store Audio/Video entertainment
- Gambling
- Home-Media
- Office
- Call Centre
- Education
- Kiosk
- Point of Sales (POS)
- Medical
- Automation
- Small server

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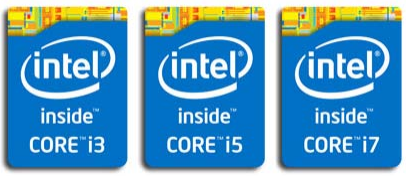
Shuttle Slim-PC Barebone XH81 – Product Features

The 3.5-litre chassis - a clean and modern look

Shuttle has always placed great emphasis on the interior and exterior aesthetics of their Mini-PCs with the belief that a good blend of style and form factor allow the Mini-PC to be attractive, versatile and work well in almost any environment. And the XH81 was designed just like that and shines in a clean and modern appearance. The optical drive and front panel connectors are easy to access in daily use.. This tiny tot barely stands 7.3 cm in height with a volume of 3.5 litres.

What does Barebone mean?

The Shuttle Slim-PC Barebone XH81 consists of a stylish case with pre-installed mainboard, cooling system and external power adapter. Despite its small form factor it offers outstanding connectivity, functionality and performance. For a complete Mini-PC system, a few components still need to be added. The Mini-PC is customisable and takes socket 1150 processors (TDP max. 65W), DDR3 SO-DIMM memoy, slimline SATA optical drive and 2.5" hard disk (or SSD). Once the desired operation system is installed, the XH81 is ready to use. Moreover, the system features pre-routed cables that are tied down from factory to reduce clutter, increase airflow and ease component installation.



Supports LGA1150 processors and up to 16 GB DDR3

A large number of socket 1150 Intel "Haswell" processors (also "Haswell Refresh") is available ranging from Celeron to Core processors with a maximum TDP of 65W. Plus, up to a maximum capacity of 16 GB of DDR3 memory can be fitted.

Low noise thanks to heatpipe cooling system

An active dual-fan heatpipe cooling system ensures whisper-quiet operation and system stability. A heatpipe is a hollow tube containing a heat transfer liquid. As the liquid evaporates, it carries heat to the cool end, where it condenses and then returns to the hot end. Heatpipes thus have a much higher effective thermal conductivity than solid materials. Please keep the vent holes clear.

Energy-saving

The power consumption mainly depends on the processor used and its load. If an Intel Core i3-4130 (3,4 GHz, TDP = 54W) processor is installed, the system consumes about 17W in idle mode. Under full load, the power consumption is 58W.
Note: the maximum output wattage of the power adapter is specified with 90W. Assuming the adapter's efficiency is 90%, the input wattage can reach up to 100W.

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Extended temperature range and reliability

The XH81 is outstandingly robust thanks to its tough chassis, and with an operating temperature range of 0-50 °C it is suitable for use in the most demanding environments. Designed entirely using all solid capacitors, XH81 is guaranteed to deliver maximum stability, reliability and longer system lifetime for long-term applications like digital signage.
Caution: for high ambient temperature over 40°C we recommend to use Solid State Disks (SSDs) instead of Hard Disk Drives (HDDs).

Great Connectivity

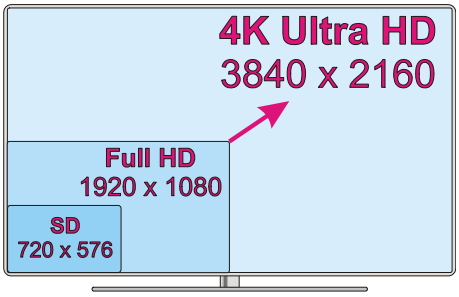
On the front, elegantly hidden from view behind drive doors, the panel reveals four USB ports two of which being USB 3.0. There are also two 3.5mm jacks for headphone and microphone. In addition, the back panel offers a wide range of I/O connectivity as well.

Dual Gigabit LAN Network

Today's media-rich communications across the internet and within enterprises create need for bandwidth. This is why Shuttle applies Gigabit-LAN performance to their Mini PCs and XH81 even supports two of them. Dual networking allows the computer to connect to a single network using two cables at once with an appropriate switch (teaming mode with load balancing or failover function) or to two different networks depending on the needs of the user.

Dual Display with HDMI and DisplayPort (optional VGA)

The XH81 features two digital video outputs: HDMI 1.4 and DisplayPort 1.2. Dual View technology offers multiple display support on up to two separate monitors. This helps improve on productivity by allowing for spreading multiple windows across two monitors while working with them simultaneously. Furthermore, the XH81 supports an optional D-Sub/VGA port. [2],[6]



Supports 4K Ultra HD at 60Hz

The XH81 supports one display running at 4K (3840 x 2160 / 2160p) high resolution when connected to its DisplayPort video output. As the successor to the Full HD standard, Ultra HD delivers a four times higher resolution with a wider colour space and colour depth.
An Intel Core i3 processor or higher is recommended for smooth 4K (2160p) video playback. [6]

Two serial ports

Many PCs do not have these legacy ports any longer, since they have been superseded and replaced by USB for most consumer applications, but they are still commonly used for applications such as industrial automation systems, scientific analysis, POS systems and other industrial applications. The XH81 features two serial RS-232 ports which also support both 5 or 12V auxiliary voltage. The lower COM port also supports the RS422 and RS485 standard.

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2x expansion slots for Mini-PCI-Express cards

The XH81 features two expansion slots for Mini-PCIe cards. One is a half size slot dedicated for an optional Wireless LAN adapter. The second has full size format and not only features a PCIe interface, but also mSATA (Mini Serial ATA), supporting the new generation of Solid State Drives (SSD) in a compact Mini PCIe card form factor.
Pictured: half size WLAN card (left) and mSATA SSD card (right).

Kensington Lock

This is a small, metal-reinforced hole as part of an anti-theft system. (The lock-and-cable are not included)

Power on after Power fail

The BIOS setup provides a "Power-On after Power Fail" function that can be found under "Power Management Configuration". As the name indicates, this function determines the PC's behaviour after power failure: (1) unconditional power on, (2) restore former status or (3) keep system turned off. As a matter of the nature of this function, it may fail after short power failures. This is why the XH81 also comes with a hardware-based solution. By removing Jumper 4 (see image) the system will start unconditionally once power is applied.

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XH61V versus XH81(V)

Comparison with the predecessor

Barebone model	XH61V	XH81(V)
Availability	June 2012	September 2014
SKUs	**XH61V Black**	**XH81V Black** (conceiled front) **XH81V White** (conceiled front) **XH81 Black** (open front)
Image		
Intel processor support	LGA1155, max. 65W 32nm Sandy Bridge, 22nm Ivy Bridge Intel Core i7, i5, i3, Pentium, Celeron	LGA1150, max. 65W 22nm Haswell (4th gen. Core CPU) Intel Core i7, i5, i3, Pentium, Celeron
Cooling system	Heatpipe cooling system with two 6 cm fans	Heatpipe cooling system with two 6 cm fans
Chipset	Intel H61	Intel H81
Mainboard	Mini ITX, 17x17cm	Mini ITX, 17x17cm
Memory support	Max. 2x 8 GB DDR3-1333/1600 204 pin SO-DIMM	Max. 2x 8 GB DDR3-1333/1600 204 pin SO-DIMM
Audio codec	Realtek ALC662	Realtek ALC662
Ethernet (LAN)	Dual Gigabit, supports Teaming 2x Realtek 8111E	Dual Gigabit, supports Teaming 2x Realtek 8111G
Storage bays	1x 5.25” Slimline optical drive 2x 2.5” hard disk / SSD Two pre-installed SATA cables	1x 5.25” Slimline optical drive 2x 2.5” hard disk / SSD Two pre-installed SATA cables
Serial ATA ports	3x SATA II (3G)	2x SATA III (6G), 1x SATA II (3G)
Mini-PCIe slots	1x half size 1x full size (supports mSATA)	1x half size 1x full size (supports mSATA)
Front panel	Power button Power & HDD LED 2x USB 2.0 2x Audio (Line-out / Mic-in)	Power button Power & HDD LED 2x USB 3.0 & 2x USB 2.0 2x Audio (Line-out / Mic-in)
Back panel	DVI-I supports 1080p/60 HDMI supports 1080p/60 2x USB 3.0 and 2x USB 2.0 2x Gigabit LAN (RJ45) 3x Audio (Mic, Line in/out) Optical S/PDIF out RS232 + RS232/422/485	DisplayPort supports 2160p/60 (4K) HDMI supports 2160p/30 (4K) [6] Optional VGA port (PVG01) 4x USB 2.0 2x Gigabit LAN (RJ45) 3x Audio (Mic, Line in/out) RS232 + RS232/422/485
Power adapter	Output 90W, Input: 100~240VAC	Output 90W, Input: 100~240VAC
Special feature	-	Always-on Jumper JP4
Optional accessories	Vertical stand (PS01) VESA mount kit (PV02) WLAN kit, 2 antennas (WLN-S)	Vertical stand (PS01) VESA mount kit (PV02) WLAN kit, 2 antennas (WLN-S) D-Sub/VGA port adapter (PVG01) 3 additional COM ports (XH81 only)

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Shuttle Slim-PC Barebone XH81 Specifications

Chassis	Slim X-type chassis, colour: black or white Dimensions: 238 x 200 x 72 mm (LWH) = 3.5 litres Weight: 2.2 kg net, 3.5 kg gross Open front - without covers for optical drive and front panel connectors Hole for Kensington Lock at the back panel Operation position horizontal or even vertical with the optional stand PS01
Storage Bays	1x for optical drive (ODD) in slimline format with 12.7 mm height 2x 6.35cm/2.5" for hard disk or SSD (max. height: 9.5 mm, upper bay: 12.7 mm) Two pre-installed SATA cables (ODD, HDD) and mounting screws included
Operation System	This system comes without operating system. It is compatible with Windows 8 / 8.1, Windows 7, Linux
Mainboard Chipset BIOS	Mainboard / Chipset / BIOS Mini-ITX form factor 17 x 17 cm, 8 layer design Chipset: Intel® H81 Express Chipset (Intel DH82H81 PCH, code name "Lynx Point") AMI BIOS in 8 Mbit EEPROM with SPI interface All capacitors are high quality solid capacitors Supports hardware monitoring and watch dog functionality Supports Unified Extensible Firmware Interface (UEFI) Supports power on after power failure [1]
Power Adapter	External 90 W power adapter (fanless) Input: 100~240 V AC, 50/60 Hz Output: 19 V DC, 4.74 A, max. 90 W DC Connector: 5.5/2.5mm (outer/inner diameter)
Processor Support	Socket LGA 1150 (H3) supports the fourth generation of Intel Core i7 / i5 / i3 / Pentium processors Maximum processor power consumption (TDP) supported: 65W Codename "Haswell", 22nm process technology, up to 8 MB of L3 Cache Supports the new generation of "Haswell Refresh" processors Not compatible with older Socket LGA 1155 processors. Does not support the unlock-function of Intel K-Series processors. The processor integrates PCI-Express, memory controller and the graphics engine on the same die (depending on processor used) Please refer to the support list for detailed processor support information at global.shuttle.com.
Heatpipe Cooling	Processor cooling with heatpipe technology and two fans (6cm)

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Memory Support	2x SO-DIMM slots with 204 pins Supports DDR3-1333/1600 SDRAM memory (PC3-10600/12800) The maximum memory clock rate depends on the processor type. Supports Dual Channel mode Supports max. 8 GB per DIMM, maximum total size of 16 GB Supports two unbuffered DIMM modules of 1.5V
Integrated Graphics	The features of the integrated graphics function depend on the processor used. [3] Supports Dual-Independent-Display at Full HD 1080p resolution Supports Blu-ray (BD) playback with HDCP Supports 4K Ultra HD resolution at 3840 x 2160 via DisplayPort (2160p/60Hz) and HDMI (2160p/30Hz) [6] HDMI and DisplayPorts support HD video plus multi-channel digital audio via a single cable Optional D-Sub/VGA connector [2]
Audio	Audio Realtek® ALC 662 5.1-channel High-Definition Audio Three analog audio connectors (3.5mm) at the back panel: 1) Front line-out (headphone) 2) Rear Surround line-out (shared with microphone input) 3) Center line-out (shared with line-in) Digital audio output is provided via HDMI and DisplayPort.
Dual Gigabit LAN Controller	Dual Realtek 8111G Ethernet network controller (Gigabit) Supports 10 / 100 / 1.000 MBit/s operation Two RJ45 ports (dual network) support Teaming [4] Supports WAKE ON LAN (WOL) Supports network boot by Preboot eXecution Environment (PXE)
Mini-PCIe slots	Features two Mini PCI Express expansion slots: 1) half size, supports PCIe 2.0 and USB 2.0, e.g. for WLAN cards [5] 2) full size, supports PCIe 2.0, SATA 3G and USB 2.0 e.g. for Mini SATA (mSATA) flash memory cards [3]
Drive Connectors	3x Serial-ATA connectors: - 2x Serial-ATA III, 6 Gb/s (600 MB/s) data transfer rate - 1x Serial-ATA II, 3 Gb/s (300 MB/s) data transfer rate Note: This barebone system comes with two pre-installed SATA cables: One for 2.5" drive and one for an optical slimline drive.
Front Panel Connectors	Microphone input Audio Line-out (headphone) 2x USB 3.0 2x USB 2.0 Power button Power LED (blue) HDD LED (yellow)

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Back Panel Connectors	DisplayPort 1.2 audio/video output HDMI 1.4 audio/video output 4x USB 2.0 2x GigaBit LAN (RJ45) [4] 2x RS232 serial ports (5V/12V, 1x switchable to RS422 / RS485) Audio Line-in Audio Line-out Audio Mic-in Clear CMOS Button Perforation for Wireless LAN antennas (2 holes) Perforation for D-Sub/VGA video output [2] Hole for Kensington Lock
Other Onboard Connectors	Power on after power fail (hardware solution, Jumper 4) [1] 1x connector for power button, LED, audio ports are all occupied by the front panel ports Fan connector (4-pin) occupied by the system fans LPC interface (2x10-pin header, 2 mm pitch) 1x analog VGA graphics output (2x10-pin, 1 mm pitch) [2]
Accessories	Multi-language user guide Driver DVD 2x cable for SATA (pre-installed for 2.5 HDD/SSD drive and optical slim drive) 1x 4-pin to SATA power cable External power adapter with AC power cord CPU heatpipe cooling system with heatsink compound Screws
Environ-mental Specification	Operating temperature range: 0~50°C Relative humidity range: 10~90% (non-condensing)
Optional Accessories	(1) Vertical stand (PS01) (2) VESA mount (PV02) (3) D-Sub VGA video output (PVG01) [2] (4) WLAN module (WLN-S) [5] (5) Three additional COM ports (Please contact Shuttle for availability.)
Conformity and Certifications	EMI: FCC, CE, BSMI, C-Tick Safety: CB, BSMI, ETL Others: RoHS, Energy Star V5.0, EuP Lot 6 This device is classed as a technical information equipment (ITE) in class B and is intended for use in living room and office. The CE-mark approves the conformity by the EU-guidelines: - EMV-guideline 89/336/EWG electromagnetic tolerance - LVD-guideline 73/23/EWG use of electric devices within certain voltage-limits

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[1] Power on after power fail:
The BIOS setup provides a "Power-On after Power Fail" function that can be found under "Power Management Configuration". As the name indicates, this function determines the PC's behaviour after power failure: (1) unconditional power on, (2) restore former status or (3) keep system turned off. As a matter of the nature of this function, it may fail after short power failures. This is why the XH81 also comes with a hardware-based solution. By removing Jumper 4 (on the mainboard near the "Shuttle" imprint), the system will start unconditionally once power is supplied.

[2] Optional D-Sub/VGA connector
The mainboard features one analog graphics connector. This 15-pin D-Sub VGA connector can be lead to the outside of the backpanel by using the optional adapter PVG01. However, you can use not more than two displays at the same time.

[3] mini-SATA (mSATA)
mSATA, not to confuse with "micro SATA", is a newer industry standard that converts the electrical SATA interface (1.5 or 3.0 Gbit/s) to the physical "Mini PCI Express" mini card form factor.

[4] Teaming Mode
The teaming function allows for grouping both available network adapters to have them work as one single adapter to create a virtual LAN. The benefit of this is that it enables load balancing and failover.

[5] Optional Wireless LAN module:
This Slim PC supports an optional WLAN module which consists of a half-size Mini-PCIe card with IEEE 802.11n functionality and an external antenna with an appropriate antenna cable. Shuttle offers a suitable accessory kit "WLN-S" with two antennas to increase WLAN range.

[6] 4K Ultra-HD resolution
A 4K-display with Ultra-HD resolution (3840 x 2160) should be connected via DisplayPort, as only this port supports a higher refresh rate of 60Hz. Certain displays (e.g. Dell UP2414Q) however require MST mode (Multi-Stream Transport) to be enabled which sends two separate images at half resolution each to the display. These two images are then combined and put in correct order by the Intel graphics driver when in Collage mode. Please note that HBR2-mode (High Bit Rate 2) must be supported by each display to have two of them run at 4K resolution.
The video playback performance depends on the video format, bit rate and the processor used. Daily office applications usually won't require the system to run under full load, however for smooth 4K (2160p) video playback requirements are different. An Intel Core i3 processor or higher is recommended here, since the performance of the integrated graphics engine of a Celeron or Pentium processor might not suffice.

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Shuttle Slim-PC Barebone XH81 – Required Components

The following components need to be added to make it a fully-configured Mini-PC:

**2.5” SATA hard disk
and/or Solid State Disk (SSD)
(two drives supported,
max. height: 9.5mm and 12.5mm)**

**optional:
mSATA module**

**Slim SATA DVD drive
12.7mm height**

**One or two memory modules:
DDR3-1333/1600 SO-DIMM
max. 8GB each**

**LGA1150 processor
TDP max. 65W
Core i7 / i5 / i3, Pentium
or Celeron**

**Windows / Linux
Operating System**

Optional Accessories

Stand (PS01)

VESA mount (PV02)

**VGA port adapter
(PVG01)**

WLAN-kit (WLN-S)

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4th Generation Intel Core Processor Family

LGA1150 socket 22nm "Haswell" processor overview (Date: August 2014)

Processors with TDP>65W are not supported by XH81 (highlighted grey)

Name	Model	Cores	HT	Clock	Turbo	Cache	TDP	Graphics	GPU max.	DDR3
Core i7	4790	4	Yes	3.6 GHz	4.0 GHz	8 MB	**84 W**	HD 4600	1.20 GHz	1333/1600
	4790S	4	Yes	3.2 GHz	4.0 GHz	8 MB	**65 W**	HD 4600	1.20 GHz	1333/1600
	4790T	4	Yes	2.7 GHz	3.9 GHz	8 MB	45 W	HD 4600	1.20 GHz	1333/1600
	4785T	4	Yes	2.2 GHz	3.2 GHz	8 MB	35 W	HD 4600	1.20 GHz	1333/1600
	4771	4	Yes	3.5 GHz	3.9 GHz	8 MB	**84 W**	HD 4600	1.20 GHz	1333/1600
	4770K	4	Yes	3.5 GHz	3.9 GHz	8 MB	**84 W**	HD 4600	1.25 GHz	1333/1600
	4770	4	Yes	3.4 GHz	3.9 GHz	8 MB	**84 W**	HD 4600	1.20 GHz	1333/1600
	4770S	4	Yes	3.1 GHz	3.9 GHz	8 MB	65 W	HD 4600	1.20 GHz	1333/1600
	4770T	4	Yes	2.5 GHz	3.7 GHz	8 MB	45 W	HD 4600	1.20 GHz	1333/1600
	4770TE	4	Yes	2.3 GHz	3.3 GHz	8 MB	45 W	HD 4600	1.00 GHz	1333/1600
	4765T	4	Yes	2.0 GHz	3.0 GHz	8 MB	35 W	HD 4600	1.20 GHz	1333/1600
Core i5	4690T	4	-	2.5 GHz	3.5 GHz	6 MB	45 W	HD 4600	1.20 GHz	1333/1600
	4690S	4	-	3.2 GHz	3.9 GHz	6 MB	65 W	HD 4600	1.20 GHz	1333/1600
	4690	4	-	3.5 GHz	3.9 GHz	6 MB	**84 W**	HD 4600	1.20 GHz	1333/1600
	4670T	4	-	2.3 GHz	3.3 GHz	6 MB	45 W	HD 4600	1.20 GHz	1333/1600
	4670S	4	-	3.1 GHz	3.8 GHz	6 MB	65 W	HD 4600	1.20 GHz	1333/1600
	4670K	4	-	3.4 GHz	3.8 GHz	6 MB	**84 W**	HD 4600	1.20 GHz	1333/1600
	4670	4	-	3.4 GHz	3.8 GHz	6 MB	**84 W**	HD 4600	1.20 GHz	1333/1600
	4590T	4	-	2.0 GHz	3.0 GHz	6 MB	35 W	HD 4600	1.15 GHz	1333/1600
	4590S	4	-	3.0 GHz	3.7 GHz	6 MB	65 W	HD 4600	1.15 GHz	1333/1600
	4590	4	-	3.3 GHz	3.7 GHz	6 MB	**84 W**	HD 4600	1.15 GHz	1333/1600
	4570TE	2	Yes	2.7 GHz	3.3 GHz	4 MB	35 W	HD 4600	1.00 GHz	1333/1600
	4570T	2	Yes	2.9 GHz	3.6 GHz	4 MB	35 W	HD 4600	1.15 GHz	1333/1600
	4570S	4	-	2.9 GHz	3.6 GHz	6 MB	65 W	HD 4600	1.15 GHz	1333/1600
	4570	4	-	3.2 GHz	3.6 GHz	6 MB	**84 W**	HD 4600	1.15 GHz	1333/1600
	4460T	4	-	1.9 GHz	2.7 GHz	6 MB	35 W	HD 4600	1.10 GHz	1333/1600
	4460S	4	-	2.9 GHz	3.4 GHz	6 MB	65 W	HD 4600	1.10 GHz	1333/1600
	4460	4	-	3.2 GHz	3.4 GHz	6 MB	**84 W**	HD 4600	1.10 GHz	1333/1600
	4440S	4	-	2.8 GHz	3.3 GHz	6 MB	65 W	HD 4600	1.10 GHz	1333/1600
	4440	4	-	3.1 GHz	3.3 GHz	6 MB	**84 W**	HD 4600	1.10 GHz	1333/1600
	4430S	4	-	2.7 GHz	3.2 GHz	4 MB	65 W	HD 4600	1.10 GHz	1333/1600
	4430	4	-	3.0 GHz	3.2 GHz	6 MB	**84 W**	HD 4600	1.10 GHz	1333/1600
Core i3	4370	2	Yes	3.8 GHz	-	4 MB	54 W	HD 4600	1.15 GHz	1333/1600
	4360T	2	Yes	3.2 GHz	-	4 MB	35 W	HD 4400	1.15 GHz	1333/1600
	4360	2	Yes	3.7 GHz	-	4 MB	54 W	HD 4600	1.15 GHz	1333/1600
	4350T	2	Yes	3.1 GHz	-	4 MB	35 W	HD 4600	1.15 GHz	1333/1600
	4350	2	Yes	3.6 GHz	-	4 MB	54 W	HD 4600	1.15 GHz	1333/1600
	4340	2	Yes	3.6 GHz	-	4 MB	54 W	HD 4600	1.15 GHz	1333/1600
	4330TE	2	Yes	2.4 GHz	-	4 MB	35 W	HD 4600	1.00 GHz	1333/1600
	4330T	2	Yes	3.0 GHz	-	4 MB	35 W	HD 4600	1.15 GHz	1333/1600
	4330	2	Yes	3.5 GHz	-	4 MB	54 W	HD 4600	1.15 GHz	1333/1600
	4160T	2	Yes	3.1 GHz	-	3 MB	35 W	HD 4400	1.15 GHz	1333/1600
	4160	2	Yes	3.6 GHz	-	3 MB	54 W	HD 4600	1.15 GHz	1333/1600
	4130T	2	Yes	2.9 GHz	-	3 MB	35 W	HD 4400	1.15 GHz	1333/1600
	4130	2	Yes	3.4 GHz	-	3 MB	54 W	HD 4400	1.15 GHz	1333/1600

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Name	Modell	Kerne	HT	Takt	Turbo	Cache	TDP	Grafik	GPU max.	DDR3
Pentium	G3460	2	-	3.5 GHz	-	3 MB	53 W	HD	1.10 GHz	1333/1666
	G3450T	2	-	2.9 GHz	-	3 MB	35 W	HD	1.10 GHz	1333/1666
	G3450	2	-	3.4 GHz	-	3 MB	53 W	HD	1.10 GHz	1333/1666
	G3440T	2	-	2.8 GHz	-	3 MB	35 W	HD	1.10 GHz	1333/1666
	G3440	2	-	3.3 GHz	-	3 MB	53 W	HD	1.10 GHz	1333/1666
	G3430	2	-	3.3 GHz	-	3 MB	53 W	HD	1.10 GHz	1333/1666
	G3420T	2	-	2.7 GHz	-	3 MB	35 W	HD	1.10 GHz	1333/1666
	G3420	2	-	3.2 GHz	-	3 MB	53 W	HD	1.15 GHz	1333/1666
	G3320TE	2	-	2.3 GHz	-	3 MB	35 W	HD	1.00 GHz	1333/1666
	G3250T	2	-	2.8 GHz	-	3 MB	35 W	HD	1.10 GHz	1333
	G3250	2	-	3.2 GHz	-	3 MB	53 W	HD	1.10 GHz	1333
	G3240T	2	-	2.7 GHz	-	3 MB	35 W	HD	1.10 GHz	1333
	G3240	2	-	3.1 GHz	-	3 MB	53 W	HD	1.10 GHz	1333
	G3220T	2	-	2.6 GHz	-	3 MB	35 W	HD	1.10 GHz	1333
	G3220	2	-	3.0 GHz	-	3 MB	53 W	HD	1.10 GHz	1333
Celeron	G1850	2		2.9 GHz	-	2 MB	53 W	HD	1.05 GHz	1333
	G1840T	2		2.5 GHz	-	2 MB	35 W	HD	1.05 GHz	1333
	G1840	2		2.8 GHz	-	2 MB	53 W	HD	1.05 GHz	1333
	G1830	2	-	2.8 GHz	-	2 MB	54 W	HD	1.05 GHz	1333
	G1820TE	2	-	2.2 GHz	-	2 MB	35 W	HD	1.00 GHz	1333
	G1820T	2	-	2.4 GHz	-	2 MB	35 W	HD	1.05 GHz	1333
	G1820	2	-	2.7 GHz	-	2 MB	54 W	HD	1.05 GHz	1333

K = unlocked, **S** = Performance optimized lifestyle, **T** = Power optimized lifestyle, **HT** = Hyper Threading (SMT).
Please refer to the support list for detailed processor support information at *global.shuttle.com*.

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